^{153}Gd IT decay (76.0 μs) 1970Bo02,1967Co20

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 170, 1 (2020)	16-Aug-2020

Parent: ^{153}Gd: E=171.188 *4*; J^π=(11/2$^-$); $T_{1/2}$=76.0 μs *14*; %IT decay=100.0
Produced by ^{153}Eu(d,2n) (1970Bo02) and by ^{153}Eu(p,n) (1967Co20) with enriched targets.
Other measurements: 1967Bo05, 1968Io01, 1972Lo04, 1979Ka16.

^{153}Gd Levels

E(level)†	J$^\pi$‡	$T_{1/2}$	Comments
0.0	3/2$^-$		
41.56	5/2$^-$		
93.34	7/2$^-$		
95.17	(9/2)$^+$	3.5 μs *4*	$T_{1/2}$: From 1979Ka16.
168.4	(9/2$^-$)		
171.188 *4*	(11/2$^-$)	76.0 μs *14*	$T_{1/2}$: Weighted average of 75.6 μs *20* (1979Ka16), 79 μs *5* (1970Bo02), and 75.8 μs *30* (1967Co20). Others: 76 μs *15* and 85 μs *17* (1968Io01) and 1967Bo05.

† Nominal value from ^{153}Gd Adopted Levels.
‡ From ^{153}Gd Adopted Levels.

γ(^{153}Gd)

Iγ normalization, I(γ+ce) normalization: Calculated to give 100% feeding to the ground state.
I(ce): The values of 1970Bo02 have been normalized to the Iγ by the evaluator to give α_L(94 γ)=1.45 (E2 theory).

E_γ†	I_γ#	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	δ‡	α@	$I_{(\gamma+ce)}$#	Comments
(1.83)		95.17	(9/2)$^+$	93.34	7/2$^-$	[E1]			34	α: Evaluator's estimate is α ≈ 90. $I_{(\gamma+ce)}$: Value assigned to give intensity balance at 95 level.
(2.8)		171.188	(11/2$^-$)	168.4	(9/2$^-$)	[M1,E2]			58	α: Evaluator's estimate α(M1) ≈ 500 and α(E2) ≈ 2×10^6. $I_{(\gamma+ce)}$: Value assigned to give 100% decay from the isomer.
41.56	10.0	41.56	5/2$^-$	0.0	3/2$^-$	M1+E2	0.255 *8*	9.5 *3*		ce(L)=73.8 *12*; ce(M)=19.7 *12* I_γ: Calculated from Ice(L) and α_L=7.4.
51.78	5 *2*	93.34	7/2$^-$	41.56	5/2$^-$	M1+E2	0.160 *10*	14.4 *1*		ce(L)=12.9 *18*; ce(M)=4.2 *4* α(K)=11.5; α(L)=2.25 *7*; α(M)=0.498 *17*; α(N+..)=0.143 *5*
75.07	4 *3*	168.4	(9/2$^-$)	93.34	7/2$^-$	[M1,E2]		6.1 *14*		ce(L)=3.7 *12*; ce(M)=1.2 *12* α(K)=3.1 *9*; α(L)=2.3 *18*; α(M)=0.5 *4*; α(N+..)=0.15 *11* I_γ: From Ice(L) and α_L(M1)=0.57 and

Continued on next page (footnotes at end of table)

^{153}Gd IT decay (76.0 μs) 1970Bo02,1967Co20 (continued)

γ(^{153}Gd) (continued)

E_γ[†]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[@]	Comments
								α_L(E2)=4.00. Also, see comment associated with Iγ(76.3).
76.01	21 *5*	171.188	(11/2$^-$)	95.17	(9/2)$^+$	[E1]	0.614	ce(L)=1.4 *5*; ce(M)=0.5 *2* α(K)=0.512; α(L)=0.0804; α(M)=0.0173; α(N+..)=0.00482 I_γ: The 75.0, 76.0, and 77.9 γ′s are not resolved; the latter two also occur in (α,3nγ), where they are not resolved, but a relative Iγ is given. From Ice(L)=1.4 *5* and α_L, Iγ(76)=18 *7*. Also, from Iγ(75+76+77)=28 *3* (1970Bo02), Iγ(75)=4 *3*, and Iγ(78) ≈ 2.5, then Iγ(76)=21 *5*. This Iγ(76) value is adopted here. In (α,3nγ), Iγ(77)/Iγ(76) ≈ 0.11, which is in agreement with the ratio of 2.5/21 adopted here. Mult.: Recognizing the E1-E2 doublet character of the 79 γ observed in (α,3nγ) and the isomer decay removes the multipolarity discrepancy pointed out by the authors.
77.9	≈2.5	171.188	(11/2$^-$)	93.34	7/2$^-$	[E2]	6.51	ce(L),ce(M): See comment for 77.9 γ. ce(L)=8.4 *20*; ce(M)=2.6 *10* α(K)=2.15; α(L)=3.36; α(M)=0.788; α(N+..)=0.217 ce(L),ce(M): 1970Bo02 report Ice(L)=9.8 *12* and Ice(M)=3.1 *7* for a γ of ≈ 79 keV. Based on the Iγ and multipolarities for the 76.0 and 77.9 γ′s, the evaluator assigns ≈ 15% of these intensities to the 76.0 γ and the remainder to the 77.9 γ. I_γ: See Iγ comment for 76 γ.
93.34	1.1 *1*	93.34	7/2$^-$	0.0	3/2$^-$	E2	3.29	ce(L)=1.60 *25*; ce(M)=0.49 *25* α(K)=1.41; α(L)=1.45; α(M)=0.339; α(N+..)=0.095
126.85	0.7 *4*	168.4	(9/2$^-$)	41.56	5/2$^-$	[E2]	1.08	α(K)=0.607; α(L)=0.363; α(M)=0.084; α(N+..)=0.0237

[†] Nominal value from ^{153}Gd Adopted γ radiations.
[‡] From ^{153}Gd Adopted Gammas.
[#] For absolute intensity per 100 decays, multiply by 0.90 *5*.
[@] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

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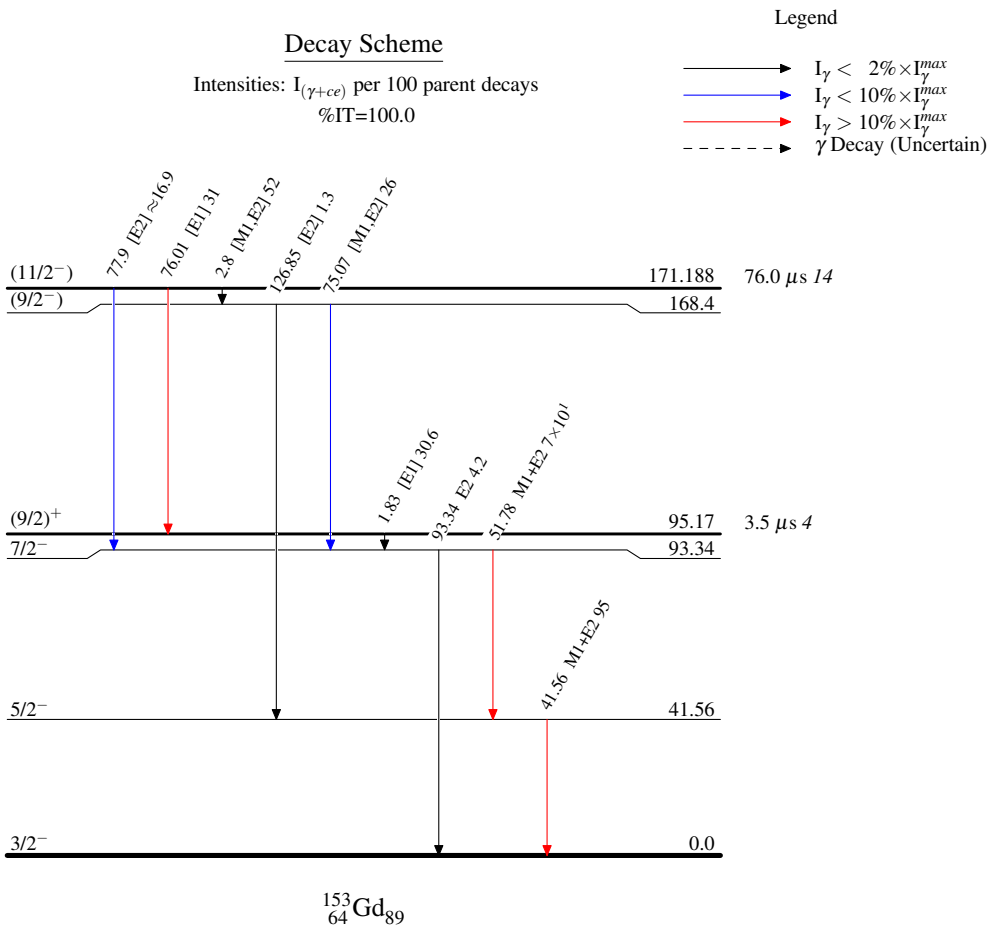
Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

%IT=100.0



$^{153}_{64}Gd_{89}$